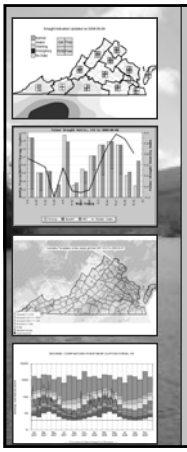


DEQ Drought Indicator Web Site

Providing Tools For Drought Planning and Response in Virginia

Goals of Drought Planning Web

Increase certainty of meeting critical uses during times of drought

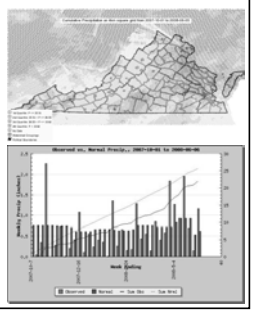
- Provide Data:
  - Hydrologic/Meteorological data for drought **indicators**
  - **Integrate** multiple sources of data into a single web site
    - Multiple indicators may form better triggers, especially early
  - Gather and distribute the most **localized** data available
  - Present data to show temporal and spatial **patterns**
- Analyze Data:
  - Provide **historical** context (how wet/dry)
  - Provide **future** projection
  - Determine general **category** (warning, watch, emergency)
- Facilitate:
  - Drought **Planning**
  - Drought **Response**

Drought Web: Data

- Rainfall
  - NOAA 4km x 4km grid – daily
  - Historical Means from 1971-2000, daily/monthly totals since 2005
- Stream Flow
  - USGS/DEQ Gaging Network reporting flow rate/gage height
  - Historical daily flow (period of record varies)
- Groundwater
  - USGS/DEQ Gaging Network
- Palmer Drought Severity Index
  - Reported by NOAA, regional level (coarse)
- National Drought Regions
- Locally derived metrics
  - These data can be used as inputs for locally derived models or analysis techniques
  - Ex: North Fork Shenandoah MIF Study

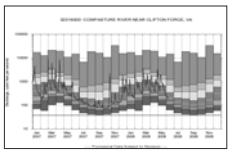
Drought Web: Rainfall Data

- "Early Warning Indicator"
- Lack of Rainfall = "Meteorological Drought"
  - Prolonged meteorological drought leads to hydrologic drought
- Fall/Winter:
  - Groundwater Recharge / Base flow
- Spring/Summer:
  - Predictor of Irrigation/Lawn demand
- All Seasons:
  - Storm Flow / Reservoir Refill

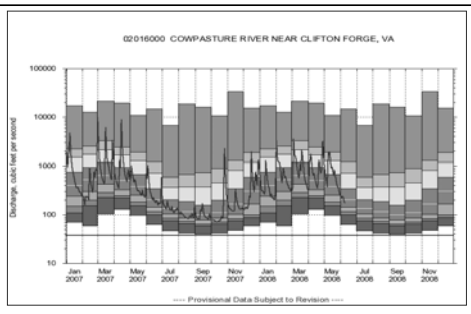


Drought Web: Flow Data

- Balance between precip. and ground water (base flow)
- 198 Real time Flow gages currently
- 395 Gages with historical, daily records
- USGS Trend analysis (1st in a series of deliverables from USGS) can show likely future flow levels

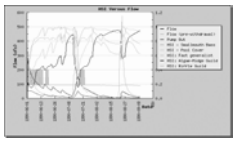


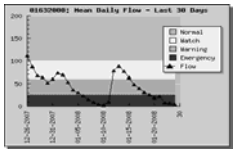
Drought Site: Flow Duration



Drought Web: Local Metrics

- NF Shenandoah
  - Large recreation component of local economy
  - Estimated that freshwater anglers generate $16.2 to $21.4 million/year
- Flow studied in 2000-2002 by VT/USGS
  - Flow needs of aquatic life, algae blooms
  - Recommended flow levels based on loss of habitat/potential for harmful WQ effects





Drought Web: Format/Analysis

- Time Series Graphs
- Percent of Historical Mean
  - Color-coded indicators reflecting thresholds used by state drought task force
- Spatial Distribution
  - Data superimposed on maps
- Localized Watersheds
  - Limited only by presence of gage(s)
  - 4 km x 4 km rainfall grid
  - Custom regions can be created if supplied geographic boundaries (GIS File), desired gages

Drought Web: Site Tour

Site Hosted at:

http://www.deq.virginia.gov/watersupplyplanning/drought/

Currently 3 Different Regional Views:

- State Drought Regions
- Shenandoah Valley Regions
- Mecklenburg and Brunswick Counties

Drought Web: Planning/Response

- Provide Data in "near real-time"
  - Site updated every day at 6 AM
  - USGS data is usually ~1 day old
  - NOAA data is valid since 8 AM on the previous day
- Provide Future Cast Data:
  - Rain Forecast
  - Stream flow forecast (selected stations)

Drought Web: Planning/Response, continued

- Maps of monitoring sites show:
  - Where the data is strongest
  - Where data gaps exist
  - Thresholds can be determined with this (un)certainty in mind
- Targeting Communications/Enforcement
  - VT report on 2002 drought showed that communication was the single most important piece of conservation measures
  - Where is it wet/dry?
  - What sub-basins need the most "message"

Drought Web: Future Tools

- Plots of Interacting Metrics
  - Ex: Flow and GW superimposed
- Modeling Water Use Restrictions
  - Enter the reductions and trigger points, and simulation will evaluate response during drought of record (or other, user selectable period)
- More Extensive Integration of Forecasts
  - Modeling flow response to forecasted precipitation
  - Probabilities of drought conditions/shortages